

HOSPITAL AND MEDICAL FACILITIES SERIES
(Under the Hill-Burton Program)

design-
equipment

Planning the
PATIENT CARE UNIT
in the General Hospital

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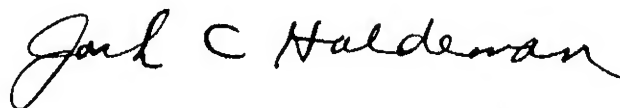
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FOREWORD

The original "Elements of the General Hospital" was published in 1946 to serve as a guide in the design of hospital construction under the Hill-Burton program. With changing concepts and practices in hospital care, the "Elements" are reviewed and revised from time to time.

This publication seeks to indicate good current practices and the direction in which developments in the design of patient care units seem to be moving. It is based on findings resulting from current research; visits to general hospitals of all sizes across the country; and consultations with many people active in the field of hospital care. Among those consulted were physicians, nurses, administrators, dietitians, pharmacists, technicians, architects, hospital consultants, manufacturers' agents, construction and maintenance personnel, and patients.

The principles are emphasized because their application by architects and others concerned with hospital planning will help to develop increasingly efficient means of implementing patient care requirements.



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INTRODUCTION

While hospitals differ in size, complexity, and in details of procedures, they all work to provide the best patient care at the least cost. All departments are designed to serve the patient, either directly or indirectly. Since most patients spend most of their time in the patient care unit, most services are focused here. "Best patient care at least cost" depends in part upon how effective that focus is.

Developments continue in equipment and materials and in administrative, operational, and nursing techniques. These are directed toward improved patient care and better utilization of personnel at all levels. The design of physical facilities must implement these aims and at the same time keep down construction and operating costs.

The extent to which automation can be applied, directly or indirectly, to patient care unit functions is a matter of considerable interest. Efforts are being made in several areas, namely, charting and chart handling, food service, medications, and supply. It is reasonable to assume that these and other efforts will result in better utilization of personnel time and improved patient care.

Facilities required for conventional units and for intermediate care units in a progressive patient care organization of inpatient services are substantially the same.^{1/} However, additional space will be required for conferences, instruction, medication preparation, laboratory procedures, charting, and similar functions in hospitals having medical, nursing, or other educational programs.

^{1/} The Public Health Service's concept of progressive patient care includes the following elements of patient care integrated into a continuing recovery program:

1. Intensive care unit for the critically ill;
2. Intermediate care unit for patients whose condition has stabilized or who are not critically ill, who require remedial care;
3. Self-care unit for patients who are able to care for themselves and who require restorative care or diagnosis;
4. Long-term care unit for patients who require prolonged care;
5. An organized home care program that is hospital-based.

A "traditional" unit is one in which the first four types of patients, noted above, might be present on one patient care unit.

The principles and plans for the patient care unit included in this publication are based on the assumption that:

1. An efficient administrative department exists to direct and coordinate the activities of the various departments.^{1/}
2. The dietary department, using a centralized system for food service, will meet the dietary needs of the patient.
3. Diagnostic facilities, such as X-ray and laboratory, are designed and staffed to fulfill the needs of the hospital.
4. A central service department is organized to provide, in a combination best suited to the individual hospital, such services as:
 - a. A pharmacy, responsible for filling prescriptions and maintaining supplies for the medication room on the patient care unit.
 - b. A central sterile supply, responsible for all cleaning, packaging, and sterilizing of supplies, materials, and equipment.
 - c. Housekeeping, responsible for all cleaning, including readying rooms after patient discharge and decontaminating rooms after infectious cases.
 - d. A laundry, responsible for processing and supplying required complements of linen and other laundered material (such as mopheads) to the patient care unit and other departments.
 - e. Central stores, responsible for the care and availability of supplies, materials, and equipment for the patient care units and other departments. (Purchasing may be here or directly under administration.)
 - f. Central distribution, responsible for the delivery of all required supplies, materials, and equipment to all departments and to patient care units.

^{1/} In small hospitals, although the "departments" may not be physical entities, each with its "head," the basic concept of responsibility should be present since the functions of "departments" differ only in degree among hospitals of different sizes.

5. A maintenance and operation department, responsible for care of the physical plant and the operation of mechanical equipment.

Figures 1 and 2 illustrate some ways of applying principles set forth here. These examples are concerned chiefly with medical, surgical, or medical-surgical units, although many of the principles are applicable to other types of patient care units. The plans shown are not, by any means, the only solutions to the various problems in planning patient care units, but may serve as guides in meeting the particular needs of an individual hospital.

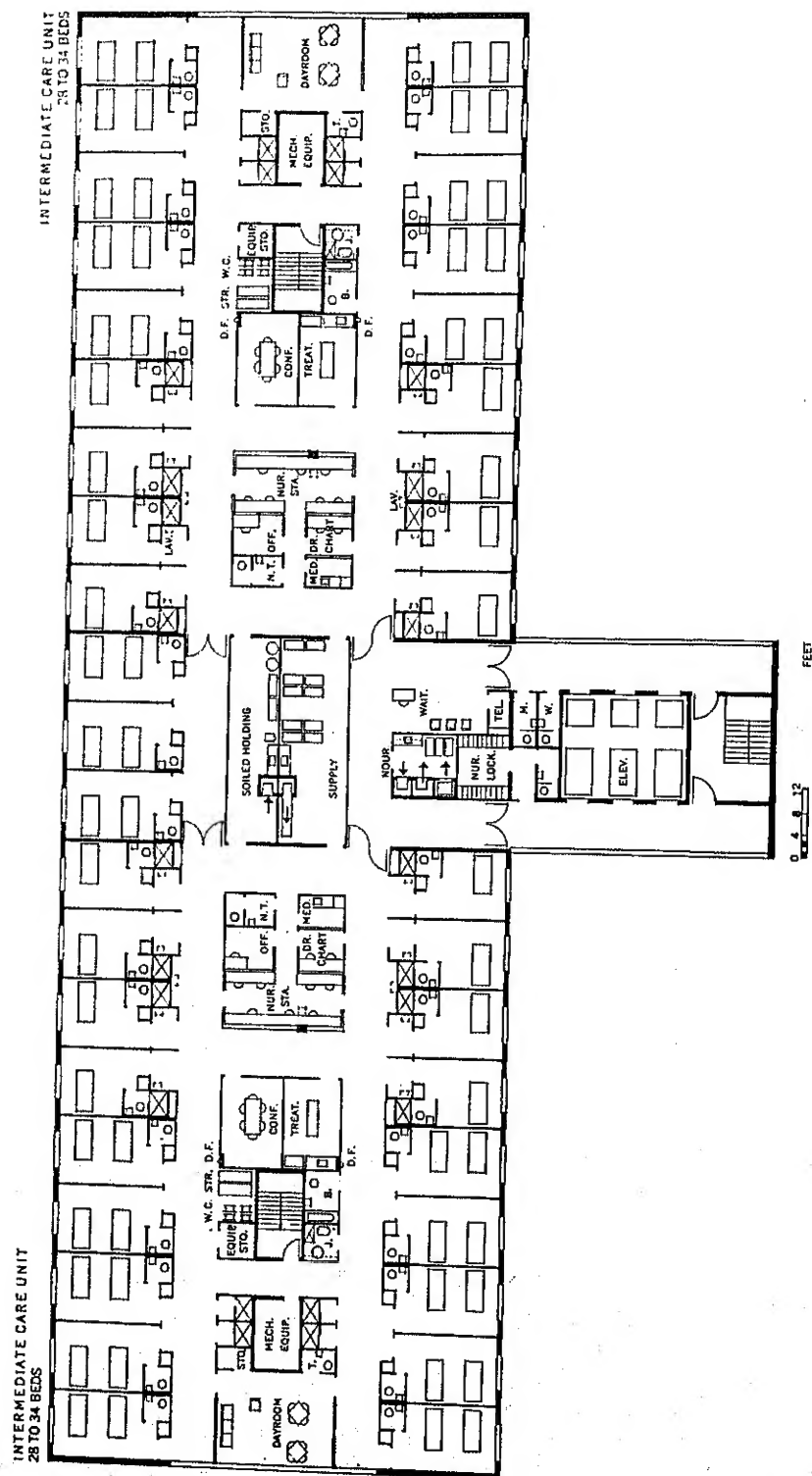


FIGURE 1. DOUBLE-CORRIDOR PATIENT CARE FLOOR MADE UP OF ONE 30-BED AND ONE 32-BED UNIT UTILIZING CENTRALLY LOCATED MECHANICAL CONVEYORS FOR THE HANDLING OF SUPPLIES AND FOOD TRAY SERVICE.

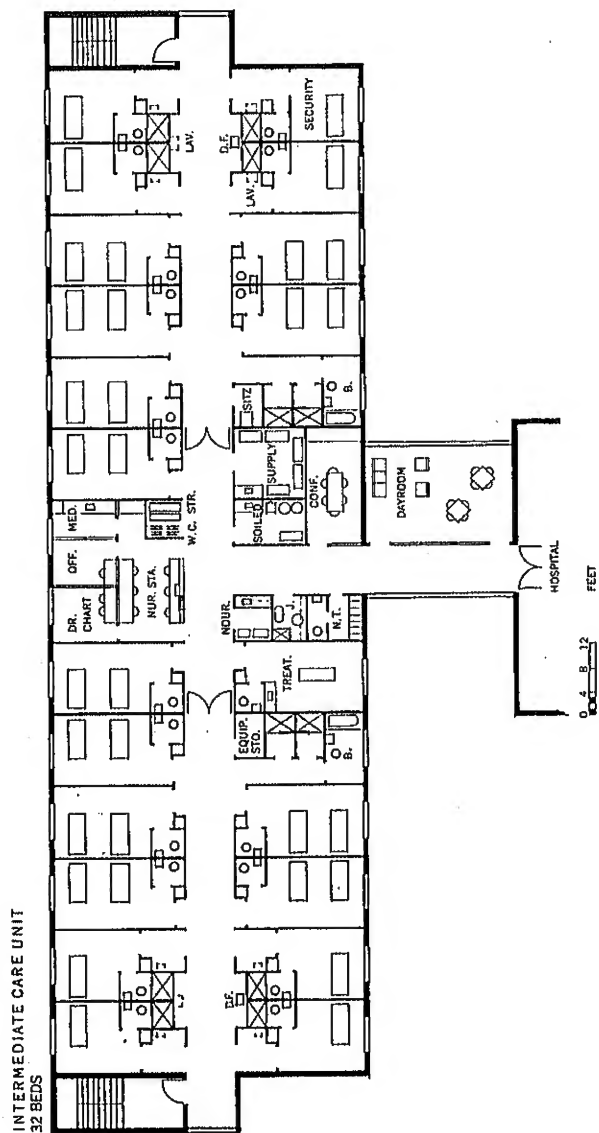


FIGURE 2. SINGLE-CORRIDOR, 32-BED PATIENT CARE UNIT UTILIZING CARTS FOR TRANSPORTING SUPPLIES AND FOOD TRAYS TO AND FROM THE UNIT. THIS TYPE OF UNIT CAN BE USED FOR ADDITIONS TO EXISTING HOSPITALS OR IN MODIFIED FORM WHEREVER SINGLE-CORRIDOR UNITS ARE INDICATED.

ELEMENTS OF THE PATIENT CARE UNIT

1. SIZE OF UNIT

In current practice, the patient care unit provides accommodations for patients whose prescribed and routine care is the responsibility of one nurse (head nurse, charge nurse, or other title).^{1/} The number of patients whose care she can direct and the number of personnel she can supervise efficiently will depend upon:^{2/}

- (1) Her own characteristics (education, experience, temperament, leadership);
- (2) Number, training, and experience of the personnel working under her supervision;
- (3) Efficiency of the patient care unit plan and hospital services provided;
- (4) Degree to which nurses are freed from duties which can be more appropriately, and economically, handled by ward clerks and the other departments of the hospital;
- (5) Type of patient, rate of turnover, and variety of patient health problems;
- (6) Number of doctors and their standards of practice;
- (7) Teaching and research programs of the hospital.

Information on all of these questions is seldom available when a patient care unit is being planned. However, they should be borne in mind because one or more of these factors may affect the size or design of the proposed unit. For example, patient care units in hospitals having student-teaching programs generally are smaller than those in hospitals having no

^{1/} In an effort to utilize scarce nursing talent to the fullest, many hospitals are experimenting with various nurse-staffing patterns and divisions of responsibilities.

^{2/} At the present time, the question of just how broad the "span of control" should or can be in the patient care situation apparently has no final answer.

teaching programs. The greater demands on the nursing staff and the increased number of personnel working on such units in teaching hospitals make the smaller unit desirable. More conference rooms, offices, and such facilities will be required in teaching hospitals, however.

Most authorities agree that quality of patient care based on the real needs of the patient should be the criterion for determining the size of the patient care unit. Although this criterion is difficult to measure, apparently it is closely related to the adequacy of supervision.

In the absence of conclusive data and in the presence of strong convictions among nurses at all levels of administration, nursing education, and patient care, and among many physicians and administrators, about 30 to 35 appears to be the maximum number of patients whose care can safely be directed by one nurse even on the most efficiently designed unit. Reasons for this are:

- (1) The head nurse must be fully aware of the needs of all of the patients as well as of the staff. When the census of the unit exceeds 30 to 35, the span of control of the head nurse is weakened.
- (2) Staff morale and the quality of patient care are decreased when, because of a large census, head nurses are unable to receive and/or assimilate a full report on each patient or to visit each patient at least once a day.
- (3) Relationships between medical and nursing staffs are strained when the volume of work is compounded by a large census. The head nurse is unable to provide the kind of information and observation desired by the physician.
- (4) Orientation of new and temporary personnel is more difficult with a large census due to the increased "busyness" of the unit.

Each hospital must decide what combination of size and type of patient care unit and other factors will produce the best patient care at the least cost in its particular situation. Those who plan to exceed 30 to 35 beds per unit should do so only with full understanding of the staffing, patient care, supply, and traffic problems involved. In any case, the size and design of units in an individual hospital should be as nearly identical as possible (except for specialized units such as pediatrics) to facilitate standardization of supplies, equipment, and staffing.

2. SHAPE OF UNIT

Each shape of patient care unit--rectangular (single or double corridor), round, square, cross, or T-shape--has its advantages and disadvantages. The choice of a shape should evolve from a careful study of the site, orientation, types of transportation and distribution intended, number of beds per floor required, hospital program, plans for expansion, relationship to other departments, air conditioning and heating loads, and construction costs. It is clear that no one shape will fulfill the requirements of every situation.

3. PATIENT ROOMS

Number of Beds Per Room

The desirable number of beds in a room and the proportion of different size rooms on the patient care unit will vary. A unit made up of one-bed rooms offers maximum flexibility of use and maximum privacy for the patient and the physician. However, such a unit is more expensive to construct and, because of greater distances between patients, may result in a reduction in the nurse's time spent in bedside care. A patient care unit made up of multiple-bed rooms has less flexibility and provides less privacy for patient and physician. But, it is less expensive to construct, provides more opportunity for observation of patients, and may save nursing time because the distance between patients is less.

The two-bed room is a compromise among: (1) the administrative need for flexibility; (2) some patients' need or desire for privacy; (3) privacy for the physician; (4) the need to give patients individual attention; and (5) the overall need to keep costs down. The most common compromise is the two-bed room.

favor the four-bed room over the one- or two-bed room because: (1) "attention" of varying kinds can be given by one nurse to more patients simultaneously; (2) there is more room for maneuvering equipment, beds, and stretchers; and (3) more frequent patient observation is possible. On the other hand, some authorities believe that patient demands, as opposed to needs, tend to increase in the multiple-bed room.

Except in special circumstances, however, the two-bed room appears to best meet the fluctuating needs and the cost requirements of the individual hospital. Currently, most patient care units consist of one-, two-, or four-bed rooms in a proportion chosen to meet both medical requirements and community preference as interpreted for each situation.

A minimum of 20 to 25 percent of the beds on a patient care unit should be in one-bed rooms for isolation and other medical reasons according to information currently available.^{1/} Special circumstances and local requirements may increase this percentage.

Room Design

Patient rooms are designed and equipped to meet the physical and psychological needs of the patient and to provide a setting in which required medical and nursing care procedures can be performed. The interpretation of these requirements varies. However, for this country, at this time certain observations can be made.

Size of Room

Clearances around the bed should be sufficient to permit the nurse to carry out nursing procedures; to move patients in bed, stretcher, or wheelchair; to accommodate necessary furniture and equipment; and to facilitate housekeeping.

In multiple-bed rooms, each bed should have a side wall clearance of at least 2 feet 6 inches. Beds should be at least 3 feet 6 inches apart, preferably 4 feet. A two-bed room should have a minimum width of 11 feet 6 inches, preferably 12 feet, for movement of beds and stretchers, and a minimum depth of 15 feet clear, preferably 16 feet. Four-bed rooms should have a minimum of 5 feet between bed ends and a minimum depth of 15 feet clear, preferably 16 feet. In hospitals having medical student or other

^{1/} A growing number of authorities believe that adequate rest and freedom from noise and confusion is so important in patient care that all patients should be in single rooms.

teaching programs, patient rooms should be large enough to accommodate several students as well as the doctor and nurse around the bed during rounds.

Some hospital authorities believe that because of fewer equipment requirements one-bed rooms on an intermediate care unit may be smaller than on a unit for critically ill patients. However, in many situations a need for flexibility and interchange among patient care units would seem to preclude reducing the size of patient rooms below a size that would permit satisfactory care of critically ill patients. For instance, most intermediate care patients could probably be cared for satisfactorily in a bed with its side against the wall. This arrangement, which reduces room widths and consequently corridor lengths, would lessen total floor area and walking distance for the nurse; but whether it would accommodate equipment and lend itself to an island bed arrangement, if necessary, must be considered for each hospital's requirements.

A full-length built-in locker or closet large enough to accommodate outside coats and clothing on hangers should be provided for each patient. These should be so arranged that no patient's locker interferes with the privacy of another patient. Each locker or closet should have drawers beneath and luggage storage above, unless these are provided elsewhere in the room. Day storage for individual patient blankets should also be provided for.

Doors should be fire safe, and measure 3 feet 10 inches to accommodate wheelchairs, stretchers, and beds.

Toilet Room and Lavatory^{1/}

the lavatory in the toilet room so that it is visible from outside the toilet room and can be used by doctors and nurses without closing the door. This location encourages handwashing by patients after using the toilet, reduces the problem of the contaminated door knob, provides privacy for the patient while using the lavatory, and permits doctors and staff to observe handwashing techniques.^{1/} An arrangement whereby the lavatory is in the patient room, but is screened from patient beds, fulfills most of these requirements and is more convenient for use by personnel. Toilet-room doors should not open directly toward patient bed areas.

The decision as to whether floor-mounted or wall-hung toilets are to be installed should be made early in the planning stage, as this may influence the location of fixtures and the design of toilet room areas. The toilet should have a bedpan flushing attachment, located to the right of the toilet, either a foot-operated or a rigid type activated by the toilet flushing handle. Most objections to these devices are traceable to improper adjustment or faulty maintenance, or to insufficient instruction of nursing personnel in handling them.

A single toilet room serving two patient rooms should be considered a minimum facility. This arrangement, however, may create inconvenience for patients and nursing personnel and reduce flexibility of room use, especially in infectious cases.^{2/} Such an arrangement should have a lavatory in the toilet room and a lavatory in each patient room to fulfill handwashing requirements of patients and staff. In any arrangement, one toilet should serve a maximum of four patients.

Windows

When determining window size and type, the following should be considered:

- (1) The effect of glass area on air conditioning and heating costs;
- (2) The problem of maintaining even temperatures throughout multiple-bed rooms;
- (3) The cost and effectiveness of light or sun control by curtains, blinds, and similar furnishings;

^{1/} Gohr, Frank, R.S., M. P. H. Spotlighting hospital sanitation: Handwashing. Hospital Management, Vol. 91, No. 3 (March 1961), p. 38.

^{2/} See Section 13, Isolation.

- (4) Whether the view from the windows justifies viewing;
- (5) Window washing and other maintenance costs;
- (6) Safety and ease of operation.

Lighting

Lighting the patient room has many aspects, especially where two or more patients must be considered simultaneously. The patient, the nurse, and the doctor each requires a different level of illumination.

Lighting levels required in the room range from a fraction of a foot-candle for nightlighting, up to 100 footcandles or more for examination or treatment. Several steps of lighting levels between these extremes are needed for patients' use and for routine nursing care.^{1/} These steps should be carefully considered so that lighting requirements will be met while initial and maintenance costs are kept low.

Noise

Noises from many sources and following many pathways are disturbing to patients on many patient care units. The sources of most of these noises are known.^{2/} Steps taken during the planning and construction stages can eliminate or reduce them.

Ventilation

Since any patient room may house a known or unknown infectious case or an odorous case, the ventilation should be so designed that air is not recirculated to other patient rooms or areas.

Miscellaneous

Electric outlets for equipment should be provided at shoulder height at the head of each bed. Emergency power outlets should be so located in corridors as to be available to any patient room.

Telephone outlets should be provided in each patient room.

All patient rooms should be equipped with piped oxygen and, if possible, vacuum.

Built-in cabinets between, and opening to, the patient room and the corridor are designed to store supplies, thus reducing trips by the nurse to the supply and holding rooms and entries by service personnel into the patient room.

Television and Radio

Provision should be made for television sets and/or radios in accordance with hospital policy, that is, whether sets are to be rented by the hospital or from outside the hospital, whether sets are to be remotely controlled and have under-pillow speakers, whether a fixed shelf is to be provided, and whether a central antenna system is to be installed. Since in most areas proper operation of the sets will depend upon a central antenna system, its installation at the time of construction should be considered.

4. ISOLATION AND SECURITY ROOMS

The type of provisions on the patient care unit for patients requiring isolation will depend upon the frequency with which the problem arises and the techniques employed. Since patients are usually isolated one to a room, it appears that a number of single rooms on each unit should be designed to accommodate the isolation techniques employed in the hospital. The number would be governed by the expected maximum number of isolated patients.^{1/}

If the hospital will have only an occasional patient requiring isolation, special arrangements can be made, as needed, on the patient care unit.

^{1/} It is reported that the number of patients in general hospitals requiring isolation may be as high as 20 percent under normal nonepidemic conditions.

However, if the hospital will have a number of patients in isolation simultaneously, the unit should be designed to facilitate the carrying out of isolation techniques.

The techniques employed will determine the provisions to be made. For example, if technique requires handwashing after personnel leave the isolated patient room, a convenient lavatory outside the room will be required.^{1/} Any technique would probably require that items such as clean gowns, masks, and supplies must be stored outside the room. Most fire exit codes, however, do not permit the cabinet or cart in the corridor outside the isolated room.

The most strict isolation technique requirements can be met by an alcove between the patient room and the corridor containing:

- (1) A lavatory with gooseneck spout, foot- or knee-operated faucets or at least blade handles, and provided with paper-towel dispenser, soap dispenser, and waste receptacle;
- (2) Space for foot-operated waste can for soiled masks, if technique so requires. (Soiled gowns would be removed inside the patient room and placed in foot-operated waste can with waterproof liner.)
- (3) Storage facilities, either on a small cart or on shelves above the lavatory, for clean gowns, masks, and other supplies.

A lavatory in an alcove off the corridor might be so located that it would serve several rooms used for isolating patients. This would reduce the number of lavatories required.

Since many isolated patients are ambulatory and may remain in the hospital longer than the average patient, bathing needs can best be met by a shower provided in addition to the toilet and lavatory normally provided for patient rooms.

The problem of handling, cleaning, and storing patient clothing, not normally kept in the isolated room, must be considered.

To provide for proper isolation technique, the ventilation of patient rooms should be so designed that the air is not recirculated to other patient rooms or areas.

Security

Most hospitals from time to time need to house, temporarily, a disturbed patient. If the hospital does not have a psychiatric unit and does not provide for these patients in the emergency department, provisions must be made on a patient care unit. At least one room should be constructed so that it can be converted quickly to such use. Such a room should have a door with a view-window cutting off the toilet room and lockers; a detention screen at the window; recessed ceiling light, switches outside the door, and detachable over-bed light; key-operated oxygen and suction outlets; proper hardware on the inner door; and radiant heating or protective covering for the radiator or heating element. For normal occupancy, the room should be converted to a typical patient room.

5. TREATMENT ROOM

Some treatments and examinations can be carried out with greater safety and privacy for the patient and for the physician, as well as greater convenience for the staff, in a treatment room.

Whether a treatment room is provided will depend upon the type of patient on the unit and upon hospital policy as to where treatments are given. Since both of these factors are subject to change, the treatment room should be arranged so that it can be converted to another function if it is no longer required for treatments. If no treatment room is provided, a conveniently located patient or other room should be designed for possible conversion to a treatment room. This would involve roughing in for a sink and installing additional electrical outlets. An increase in the percentage of single rooms on the unit may (or may not) affect the use of a treatment room. This will depend upon hospital policy.

The treatment room should contain, in addition to space for necessary equipment, a counter sink with gooseneck spout and blade handles for preparation for treatment, rinsing, and handwashing. The sink area should be equipped with a paper-towel dispenser, soap dispenser, and waste receptacle. Piped oxygen and vacuum should be provided. A bulletin board should be provided.

As a precaution against possible cross-infection, materials should be readily cleanable and procedures for infection-control must be established and followed. The treatment room should not be used for other purposes such as storage or team conferences. Treatment trays, some of which may be used in a patient room, and other general supplies should not be kept here, except such emergency trays required by hospital policy. Treatment trays should be kept in the supply room and soiled materials disposed of in the soiled holding room. An X-ray film illuminator may be installed here, if required.

Doors should be 3 feet 10 inches wide to accommodate wheelchairs, stretchers, and beds.

6. BATHS, SHOWERS, AND TOILETS

Each patient shower and each dressing area should be at least 3 feet by 3 feet to provide room for a stool or wheelchair and for grab-bars. Plumbing fixtures should include a hose attachment for a sit-down shower. Shower rooms need not be segregated by sex but should have a light in the corridor controlled by the switch inside the room to indicate occupancy. The same switch should control mechanical ventilation. Emergency call buttons should be provided in each dressing area, reachable from either shower or dressing space. Floors should be flush with corridor floors, with no raised thresholds, to accommodate wheelchairs. The dressing area should drain into the shower for safety and ease of cleaning.

Opinions vary as to the number of showers required on a patient care unit. The type of patient and community preference will influence the number provided. With scheduling, however, it appears that a minimum of four common showers should suffice on a 30- to 35-bed unit, especially if each single-bed room is equipped with a shower for isolation purposes (see Section 4, Isolation).

At least one tub should be provided in each patient care unit for treatment and for patients who require or prefer a tub for bathing. Whether the tub should be a raised-island type will depend upon the type of patient

on the unit and local preference. A toilet should be provided in the tub-room. This can be used as a training toilet. Some hospitals prefer the fixed-type sitz bath to the portable type. Tub and sitz baths should be installed in separate rooms, each equipped with grab-bars, emergency call, and occupancy light. Each room should be able to accommodate a wheelchair patient.

A toilet and lavatory should be provided for the dayroom, with nurses' call, grab-bar, mirror, paper-towel dispenser, soap dispenser, and waste container.

Except in small hospitals, each patient floor should provide toilets to accommodate doctors, non-nursing personnel, and visitors.

7. NURSES' STATION

The nurses' station is the communications, administration, and charting center of the patient care unit.^{1/} It should be centrally located within the unit to reduce distances to a minimum. Although it is desirable for the nurses' station to be so located that activity within the unit may be generally observed, it is usually not considered necessary that the nurses' station command the entrance to the unit or to the elevators except on special units, such as a psychiatric unit. Visitors should be screened and directed at the main lobby, and if desired, by a volunteer stationed at the elevators on the nursing floor during visiting hours. Hospital personnel requiring information can go to the nurses' station.

Charting positions should be provided for nurses and a work station provided for at least one ward clerk who, it is assumed, will among other duties:

- (1) Take incoming calls on the telephone and call systems;
- (2) Handle pneumatic tube system, if provided;
- (3) Make out and process requisitions;
- (4) Obtain and return charts to central records department;
- (5) Make such entries on charts as hospital policy requires;

^{1/} Various means of decentralizing this center are being tried in an effort to bring the nurse closer to the patient.

- (6) Direct visitors and personnel, if necessary;
- (7) Operate record imprinter.

The number of charting positions needed will depend on the number of patients and on the nurse-staffing pattern of the unit. Five or six charting positions and one ward-clerk station are usually adequate for a 30- to 35-patient unit. Ward-clerk stations should be provided whether or not ward clerks are contemplated, since these functions must be carried out by someone and facilities should be conveniently related to the station.

Counters should be open underneath, where possible, with drawers placed only where required. This will help discourage the storage of unrelated items. Forms should be kept in a rack at the back of the counter and extra forms should be stored in a special cabinet, in drawers at the station, or in the supply room.

A safe storage place for nurses' purses should be provided in specially designated cabinets, drawers, or purse lockers either at the nurses' station or in a lounge. Adequate bulletin boards should be provided.

A nurses' toilet with lavatory should be provided convenient to, but not opening into, the nurses' station. The lavatory should be equipped with blade handles and provided with paper-towel dispenser, soap dispenser, waste receptacle, mirror, and shelf. Whether a nurses' lounge is provided on the nursing unit will depend upon hospital policy.^{1/}

Because of conflicting responsibilities and the number of personnel involved, the staffs for more than one patient unit should not usually operate out of a single nurses' station, even though the station may be large enough to accommodate them. Each patient care unit should have its own nurses' station and supporting services. Supply, holding, and nourishment areas, however, may serve more than one unit, provided they are located so that they are convenient to all units.

8. MEDICATION ROOM

The medication room is used for the storage and preparation of medications. This room should be enclosed for quiet, clear-glazed for observation both in and out, and sized to accommodate more than one person, because with team nursing, students, private-duty nurses,

^{1/} See also Section 19, Lockers for Nursing Personnel.

preoperative and postoperative care, several persons may often work here simultaneously. The pharmacy should be responsible for stocking. Minimum requirements for a medication room are:

- (1) Shallow or stepped shelves divided by some means for individual patient medication, with a system for readily changing patient identification;
- (2) A double-locked narcotics safe, with red warning light to indicate when the safe is unlocked, installed at eye level above the counter;
- (3) A counter having drawers underneath for storage of syringes and similar items, but open below without cabinets;
- (4) A bulletin board.

A sink large enough for handwashing, equipped with gooseneck spout and blade handles, should be installed in the counter. This area should be equipped with paper-towel dispenser, soap dispenser, and waste receptacle. A separate waste receptacle for broken glass and other nonburnable items should be provided.

A refrigerator mounted above the counter is more convenient, provides better visibility for drug storage, and allows greater ease in cleaning. An undercounter refrigerator with slide-out, removable tray shelves is acceptable.

Various methods of using automation for greater accuracy and speed in dispensing medications are available or being tested. Some require especially designed areas. The applicability of these systems will depend upon the individual hospital situation.

9. CHARTING AREA

Patient charts are used by the doctor, the nurse, and the ward clerk. These people should have ready access to the charts and a quiet place in which to work on them. Some authorities believe that a separate charting room should be provided for doctors, with provision for dictating and for passing charts through to the nurses' charting area. An X-ray film illuminator and a bulletin board may be installed in the doctors' charting area. Others believe that doctors' charting should not be separated from nurses' charting because of the need for close cooperative relationship among doctors and nurses. If separate charting areas are not

provided, a separate dictating room or booth should be provided. In hospitals having medical student teaching programs, the area required for doctors' charting is greatly increased and should reflect the practices of the individual hospital.

10. CONFERENCE ROOMS AND OFFICES

One office located adjacent to the nurses' station should be provided for the use of the head nurse and for conferences between the head nurse and other staff members. This office should have clear-glazed walls to permit observation, with draw curtains for privacy.

A conference room, accommodating 6 to 10 persons, should be provided on each unit for reports, team conferences, inservice programs, and conferences with patients or family. Bulletin boards, blackboards, and provisions for visual aids may be installed here. Hospitals having teaching programs will require additional office and conference space, depending on the nature of these programs.

Current experience indicates that hospitals employing a ward or floor manager plan may require an office for the manager. The location will depend upon the number of patient care units for which the manager is responsible and the division of responsibilities with the nursing service.

11. DAYROOM

The size and location of the dayroom will vary with the type of patient and with hospital policy. If many patients on a patient care unit

If visitors are permitted or encouraged to use the dayroom or if it is to be used as a television room, it should be located and designed so that the noise will not be disturbing in patient rooms. Locating the dayroom across from the nurses' station is usually objectionable. This location tends to increase noise and traffic in an already congested area and also to reduce the privacy of doctors and nurses in and around the nurses' station.

In any event, the uses to which the dayroom will be put should be determined before it is sized or located.

Additional space away from the patient care unit, such as a roof-deck or penthouse room, may be used to advantage by many patients and their visitors. Such a facility may complicate control but helps reduce traffic and noise on the unit.

12. SUPPLY ROOM

The supply room is the central storage and distribution point for all sterile and nonsterile supplies used on the unit, including linen, but not including:

- (1) Office supplies and forms usually kept at the nurses' station-- but could be kept in the supply room;
- (2) Medications;
- (3) Dietary supplies which hospital policy requires to be kept in the nourishment room;
- (4) Equipment which is kept in the equipment storage room (see Section 18).

Supplies should be replenished on a complement basis, by central service personnel, and stored on either fixed shelving or shelving on wheels. The latter type has the advantage of:

- (1) Flexibility of available shelf space;
- (2) Visibility, which facilitates locating and replenishing items;
- (3) Convenience of use;
- (4) Greater ease in cleaning the shelves and the room;

- (5) Less handling of materials.

The number of carts required depends upon complements worked out by the hospital. Specialized nursing units will require special cart complements. However, all carts should be of uniform size with adjustable shelves, easily movable, equipped with adequate bumpers at wall base level and quiet casters.

In addition to storage space in this area for carts, a counter sink with a gooseneck spout and blade handles should be provided for handwashing and for such simple preparations for bedside use as may be necessary. The sink area should be equipped with a paper-towel dispenser, soap dispenser, and trash receptacle. A bulletin board should also be installed.

13. SOILED HOLDING ROOM

This room is designed for the care and holding of soiled utensils and materials, except dietary items, awaiting transport to other areas, such as the central sterile supply or laundry.

Facilities needed are:

- (1) Clinical sink, with foot control, for disposal of liquid waste.
Wall faucet, with foot control or blade handles, for rinsing.
Rim of sink should be 28 to 30 inches above the floor.
- (2) Counter sink, with gooseneck spout and foot or knee control or blade handles, for handwashing and for rinsing. Sink area should be equipped with paper-towel dispenser, soap dispenser, and waste receptacle.

Trash from patient rooms and other areas should be taken directly to the incinerator when collected, if possible. If it must be stored temporarily, the soiled holding room (not in the janitor's closet) is the place for such storage. (See Section 15.)

14. LINEN

Authorities agree that linen should be handled as few times as possible to reduce the chances of cross-infection and to conserve personnel time. This indicates the use of carts^{1/} small enough to be returned easily to central service or laundry for stocking, parked in the clean supply room with other clean supplies, and moved to patient room doors during routine bedmaking. Bags of soiled linen should be deposited in the soiled holding room for return to the laundry.

Following patient discharge, the cleaning and preparation of the patient room is usually the responsibility of housekeeping. Packaged linen for discharge beds may be stored in the supply room or on a special cart containing all necessary equipment for the preparation of discharge rooms. This cart may be stored, cleaned, and replenished in central service or housekeeping department and brought to the patient care unit when required.

Linen chutes have been found to distribute airborne contaminating elements to all floors served and are not recommended. If installed:

- (1) Linen must be securely bagged on the patient care unit;
- (2) Wet or damp linen must be bagged in waterproof bag or liner;
- (3) Chute door must be located in a well-ventilated soiled holding or chute room, not in a corridor or clean area. Because of misuse of linen chutes, some hospitals have found it necessary to restrict use of the chutes to designated personnel.

15. HOUSEKEEPING

The chief function of housekeeping on the patient care unit is the removal of soil and dust from all surfaces in order to prevent cross-infection and reinfection of patients and to protect personnel. This should be accomplished with the least interference with nursing activities and without transferring undesirable elements from one surface to another

^{1/} A 30- to 35-bed patient care unit would usually require two linen carts of this size.

through poor cleaning techniques. The test for cleanliness in hospitals of all sizes should be the laboratory culture, not the degree of shine on surfaces.

Controlled studies indicate that wet-mopping and damp-dusting (or washing) with a carefully selected disinfectant cleaner employed according to a specific technique give the best results in removing dust and soil.^{1/}, ^{2/} However, cleaning agents, cleaning techniques, and the scheduling of cleaning operations will vary widely, depending upon the materials of the surfaces to be cleaned, type of patient, activity on the patient care unit, and the standards of cleanliness set by the hospital.

In order to facilitate the carrying out of proper cleaning techniques, the janitor's closet on the patient care unit should contain:

- (1) A depressed floor sink with bucket hook on wall-mounted mixing faucets (a hose attachment may be used if a vacuum breaker is provided). The depressed sink permits flushing out the room without providing an additional floor drain.
- (2) A mop-handle rack over the sink. Mopheads should be removed after use and placed in the soiled holding room for return to the laundry. Soiled mopheads should not remain in the janitor's closet.
- (3) Shelves for detergents, disinfectants, cleaning cloths, and other cleaning materials.
- (4) A rack on the wall for a ladder.

of unrelated items. Floor and wall surfaces should be easily cleaned. Lighter colors for surfaces than are customary will promote cleanliness by making soil more apparent. Adequate mechanical air exhaust is important to prevent the spread of odors and airborne contaminants.

Equipment used for cleaning rooms after patient discharge and for daily cleaning should be kept on special maids' carts in central service or housekeeping and brought to the floor and returned by the maid as required.

All waste receptacles on the patient care unit should have disposable liners which are closed before removal to a wheeled, closed refuse cart for transportation to the incinerator. Trash chutes, even under the best conditions, have been found to distribute airborne contaminating elements to all floors served, to be a fire hazard and a source of vermin. They are not recommended. If installed:

- (1) Chute should conform to the National Fire Protection Association (NFPA) Regulation 82-A;
- (2) All trash should be securely bagged (no loose trash);
- (3) Wet or damp trash should be bagged in waterproof bag or liner;
- (4) Chute door should be installed in a well-ventilated soiled holding or trash room, not in corridor, janitor's closet, or clean area.
- (5) A 7-day-a-week service for removal of trash from the bottom of the chute must be maintained for fire safety.

Supplies such as paper towels, toilet paper, and dispenser refills of soap tissues should not be stored in the janitor's closet, considered a "dirty" area. These should be kept in the clean supply room.

Dry vacuum machines, if used on the unit, should be equipped with high efficiency filters, should have exhaust blowing upward (not down), and should be usable as wet vacuum when needed for picking up gross spillage and for floor flooding after infectious cases. Whether a machine is kept on each unit will depend upon housekeeping techniques and availability of machines.

If floor maintenance machines are used for corridors, they should be kept in central service^{1/} or the central housekeeping for proper cleaning, maintenance, control, and availability.

In hospitals employing a ward or floor manager system, a housekeeping equipment room may be provided convenient to the patient care units to be served. Its size and facilities will depend upon the number of units served and the hospital's requirements. Sanitation safeguards should be emphasized both in design and use. A small janitor's closet may be required on each patient care unit to take care of spillage and similar incidents. In some cases, however, equipment for this purpose may be kept in the soiled holding room, since this cleanup must often be done by nursing personnel.

16. NOURISHMENT FACILITIES

The hospital dietary department generally employs a centralized system for patient food service.

Food trays may be transported either on enclosed carts, heated or unheated, to the patient care unit by an elevator, floor-level dumbwaiter, or vertical tray conveyor. These trays may be hand-carried to patients or may be transported on small carts by nursing or dietary personnel.

Food trays may be returned directly to the central dishwashing room by the same method used to service the unit. The speed and efficiency of the system of service will depend upon layout, equipment, and proper utilization of personnel.

In addition to providing three meals daily, other patient dietary requirements must be met:

- (1) Prescribed nourishments, tube feedings, and deferred meal trays should be centrally prepared and transported to the unit by one of the ways previously mentioned. Distribution on the unit may be made by dietary or by nursing personnel.

^{1/} Central service herein refers to overall service control.

- (2) Nonscheduled nourishment involves a request for nourishment service other than at appointed hours. Requests made between 7 a.m. and 7 p.m. should be filled by the dietary department, whereas requests made between 7 p.m. and 7 a.m. must, in many instances, be filled by nursing personnel.

If the policy of the hospital provides for substantial nourishment, such as tea, soup, and toast in addition to the usual juice, milk and crackers, facilities for storage and preparation become more elaborate. There is a trend in many hospitals toward reducing the variety of available, unscheduled between-meal nourishment.

Ideally, the dietary department should make provision for meeting dietary requests at all hours; however, few hospitals are able to absorb the costs for these additional services. A separate facility on the patient unit will provide for the preparation of the occasional dietary request. This nourishment room can serve more than one unit if conveniently located.

- (3) Preparation and service of ice water was considered a routine function, until recently. However, since studies on the bedside carafe and the handling of ice for the carafe have revealed both to be potent sources of contamination, hospital management now recognizes the importance of more adequate control of this service. Responsibility may be assumed by the dietary department or by the nursing service.

When responsibility is assumed by:

Dietary department: Wide-neck water carafes and glasses are washed in the central dishwashing room; carafes are iced in the dietary department or the patient care unit nourishment room and distributed to patients by dietary personnel. Glasses are placed on the patient's meal tray.

Nursing service: Carafes may be washed in the central sterile supply or in the dietary department, but not on the patient care unit, as an acceptable standard of cleanliness is not apt to be achieved here. Icing of the clean carafe should be done in the nourishment room.

The provision of an ice-making machine on the patient care unit will depend upon the need of ice for treatment and drinking purposes. For example, the use of sealed, plastic freeze packs for treatment and the service of ice water by the dietary department would presumably eliminate the need for an ice-making machine on the unit. In any case, if ice is required, it should be manufactured by a self-dispensing type of machine on the patient care unit, to eliminate the use of a scoop and to reduce the possibility of contaminating the ice. Ice should not be transported in bulk from any other part of the hospital.

In new construction, consideration may be given to the installation of central piped ice water to patient rooms as a means of eliminating the ice-making machine and the use of carafes, thus reducing the possibility of contamination. With the piped system, the use of freeze packs for treatment would therefore be required. Success of this system would depend upon the type of patient and upon hospital policy.

17. STRETCHERS AND WHEELCHAIRS

The number of stretchers and wheelchairs required on the unit will depend upon:

- (1) Whether surgery, X-ray, and other departments send for patients (which is the accepted current practice), whether nursing personnel bring patients to these departments, or whether a central patient transport service is provided;
- (2) Hospital policy on moving patients in beds;
- (3) Hospital policy on use of treatment rooms.

One stretcher and two wheelchairs are recommended as a minimum for each 30- to 35-bed medical, surgical, or medical-surgical unit. These should be stored in an alcove off the corridor.

It is probable that an intermediate care unit in a progressive patient care nursing program will require more wheelchairs than a traditional unit since the critically ill and self-care patients on a traditional unit would not normally need them. A minimum of four wheelchairs is recommended for a 30- to 35-bed intermediate care unit.

18. EQUIPMENT STORAGE

A direct relationship exists between the efficiency of the distribution system within the hospital and the amount of storage space required on a patient care unit. If equipment is readily obtainable from central service or central storage in a hospital of any size, minimal or no equipment storage space is required on the unit. This saves expensive space on the unit, helps to reduce the required overall inventory, and discourages hoarding.

With a reasonably efficient system of distribution in the hospital, the maximum storage requirements on a patient care unit would include space for the following equipment:

- (1) Inhalation therapy equipment. (If a centralized piped oxygen system is installed, the accessory equipment is minimal in size and one set can be kept in the supply room for emergency use.)
- (2) Suction equipment. (If a central vacuum system is installed, one set of suction apparatus can be stored in the supply room for emergency use.)
- (3) Bedrails. (Storage of these will not be required if beds have integral bedrails.)
- (4) Floor-type intravenous stands. (Bed-type rods can be stored in the supply room on a wall rack if not permanently attached to beds.)
- (5) Patient lifter, walker, or similar equipment. (Such equipment may be required on some units for a period of time, during which it may be stored here or with wheelchairs and stretchers. When no longer needed, it should be returned to central service to be cleaned and to be available to other units.)
- (6) Patients' scales. (These may be kept in the treatment room.)

19. LOCKERS FOR NURSING PERSONNEL

Some hospitals provide locker rooms for nursing personnel, including practical nurses and aides, on each patient floor. These usually serve staffs from more than one patient care unit. If these facilities are provided, they should be near the elevator or entrance to the floor so that

nurses will not pass through a patient care unit on arrival and departure. Individual full-length lockers for each person and a toilet with lavatory are required. A lounge or restroom may be included, depending upon hospital policy.

Advantages:

- (1) Personnel may report for duty more promptly;
- (2) Coats, umbrellas, and other personal items will not be brought onto the unit;
- (3) Morale of floor personnel may be strengthened by closer association of the group.

Disadvantages:

- (1) Transfer of personnel to other units may complicate locker assignment;
- (2) Personnel may be tempted to leave the unit more often.

20. TRANSPORTATION

The movement of equipment, supplies, food, and people to and from the patient care unit has become increasingly complicated and important because of rising costs, scarcity of personnel, new methods, and increased infection rates. The choice of transportation methods will generally be one of the chief determining factors in the layout of the hospital plan and should be established before the physical plan is begun.

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of specially designed carts as shelves on wheels. These carts, along with food conveyors and equipment, are usually moved vertically by elevator or, if properly sized, by floor-level dumbwaiters. Such carts may be used in conjunction with mechanical conveyors as a means of storing materials and supplies in the supply room on the patient care unit or moving supplies about the unit without additional handling.

Elevators

Elevators should, where possible, be located outside or separated from the patient care unit. They are a source of contamination and of noise disturbing to patients. Because of the many people entering and leaving, and because of air turbulence caused by the action of the car as it moves in the shaft, the elevator car and lobby are highly contaminated areas. If the lobby is placed within the patient care unit, it should be enclosed, should have adequate air exhaust to reduce the spread of contaminated dust, and should, along with the car, receive special housekeeping attention.

The question of using the same elevator for clean and soiled materials, for food conveyors, supply carts, and for people, is controversial. Consideration should be given to designating one elevator for service and to assuring special housekeeping attention. For hospitals of 200 beds and over, separate service elevators and smaller high-speed passenger elevators should be considered to speed service and separate traffic. Controls should be carefully designed to accomplish the control of elevators desired in the individual hospital.

Dumbwaiters

Either counter-level or floor-level dumbwaiters may be used to advantage, if properly located. The floor-level type often eliminates two handlings of the material being transported, by accommodating a cart which is rolled on at the source and off at the destination. Either type should be installed only where charge and discharge openings occur in areas which are normally manned, and not in corridors.

The counter-level type can best be used where the number of stations is limited, such as between pharmacy and pharmacy dispensing, or where use is limited, such as between the dietary department and the nourishment room on the patient care unit for supplemental between-meal nourishment service.

Mechanical Conveyors

Vertical and horizontal conveyor systems provide direct and rapid means of transporting either food trays from the kitchen to the patient care unit, or supplies from central service to the patient care unit. The arrangement of the hospital rather than its size is apt to determine the use of such a system. Its use for moving supplies also depends upon a centralized distribution system. Although no precise information is currently available, indications are that clean and soiled food trays, and certainly clean and soiled materials, should be transported in separate shafts.

Responsibilities and techniques for cleaning and maintaining the shafts and equipment must be worked out, understood, and followed in order to provide safe and efficient service.

Pneumatic Tubes

The pneumatic tube was originally designed to convey messages. However, in the automatic routing models, it can be utilized for transporting a wide variety of materials. This may include patient records, pharmaceuticals, and laboratory specimens. Its use is limited chiefly by size, packaging methods, and hospital policy. Before a tube system can be intelligently laid out, the interdepartmental relationships and divisions of responsibilities within the hospital must be clear. Such a system can be a valuable aid in hospital efficiency, but only through careful planning for maximum use can its cost be justified. By its nature, the pneumatic tube system generates noise. Positive steps must be taken--by insulating the tubes and padding the stations--to reduce the effects of this noise.

21. COMMUNICATIONS

Paging Systems

Paging is for the purpose of locating and communicating with physicians or other hospital personnel. This may be accomplished by:

- (1) A general audio system controlled at the telephone switchboard or the information desk, with speakers placed in areas where hospital staff members are likely to be. This system is subject to misuse, which results in disturbance to patients and others. Strict administrative control is required.
- (2) A system similar to the above, using lighted numerals on wall- or ceiling-mounted boxes. This has the advantage of being quiet, but is not so effective in attracting the attention of the person being paged.
- (3) A radio system, consisting of a central broadcasting station and pocket receivers issued to persons who may be paged. This system has the advantage of restricting the noise to a faint buzz or voice in the receiver being paged and may have a range well outside the hospital.

The real requirements of the hospital should be considered in the selection of the paging system. These will vary with size, layout, hospital policy, and other factors. Some hospitals may require both radio and general paging systems.

Telephones

The telephone, through a switchboard or direct dialing, remains the chief means of communication between the patient care unit and other departments in hospitals of all sizes. Hospitals having a central dictating system for charting may use the telephone for this purpose so that doctors can dictate from any telephone in the hospital or, if necessary, from outside.

Intercommunication Systems

In some situations, if the telephone systems may be overburdened, a special intercommunication system may connect the patient care unit with other departments, different areas of a single unit, or two or more patient care units with each other. Here again, its usefulness will depend upon the real requirements of the hospital.

Pneumatic Tube

The pneumatic tube is a great time-saver in delivering written material of all kinds. (See Section 20, Transportation.)

Transcription Systems

Electronic transcription equipment, which transmits written messages from one station to another, is being used successfully in some hospitals. It has the advantage of leaving a written record of the message at both the sending and the receiving station.

Doctors In-and-Out Register

The functions of this registering device have been broadened to include direct voice communication between the registering stations and medical records, telephone switchboard, and other areas as required in the hospital.

In many existing hospitals, an organized messenger service is utilized. While such service may be slower than mechanical devices, this system obviates the necessity of sending other personnel from duty on errands throughout the hospital.

The guide material presented in this publication is designed to be an aid, not a substitute, for thoughtful consideration of the many inter-related problems in individual hospital design.

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